Inspiration Generation

IVView

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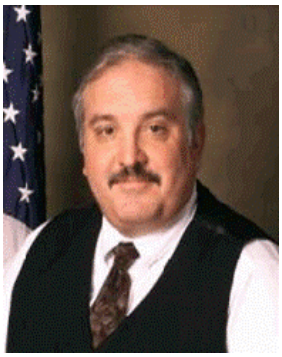
NATIONAL AERONAUTICS AND SPACE ADMINISTRATION

INDEPENDENT VERIFICATION AND VALIDATION FACILITY

The view from here...



Who is the *Inspiration Generation*?

Our cover and several of the stories in this issue were inspired by a stop to pick up a pizza. A meaningful reminder to consider all that is inspiring about NASA's missions — past, present and future — came to two of our NASA IV&V family members when a local pizza maker shared his youthful memories of Apollo. Read about their experience in *A Slice of History* on page 6

The Apollo missions brought an amazed world to a standstill. Since that time, we have had more and more reasons to be amazed—by the technology that supports NASA's missions, and the effective transition of that technology. IV&V is deeply committed to transitioning the work of its own researchers into practice. Recently we were honored to have one such effort highlighted in an article in NASA's technology transfer publication, *Spinoff*. We proudly share an excerpt of that article with you along with two more articles detailing IV&V's development of additional transferable technology.

In this issue we take a look back here and there at those missions that inspired many of us to work for NASA. We hope that we are inspiring the next generation through our student and community outreach by telling them about our work on such projects as the Space Shuttle missions, the International Space Station, and now, as part of our services to the Constellation Program, Orion.

The IV&V team members have inspired and impressed me by their commitment to hold fast to the organization's values while developing ever more agile processes. Several of them have so impressed their colleagues that *Peer Awards* were presented to them for their outstanding contributions. Join me in applauding their achievements as you turn to the last page to read about *Our Value-Ables.*

Let me wish you a new year that is not only happy, but productive and successful. I am confident that we will be having just such a year at IV&V, and I look forward to telling you all about it in 2007.

Dr. Butch Caffall
Director, NASA IV&V Facility

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About our cover:

Apollo 11, Discovery STS-116 and Constellation represent the past, the present and the future of space exploration.

A simple stop to pick up a pizza — a meaningful reminder that we are *all* members of the *Inspiration Generation*.

Generations of NASA family members have participated in the most amazing endeavors the world has ever known. With this issue we honor all of those who have labored in the Space Program and all of those who have supported them and continue to stand with them in awe.

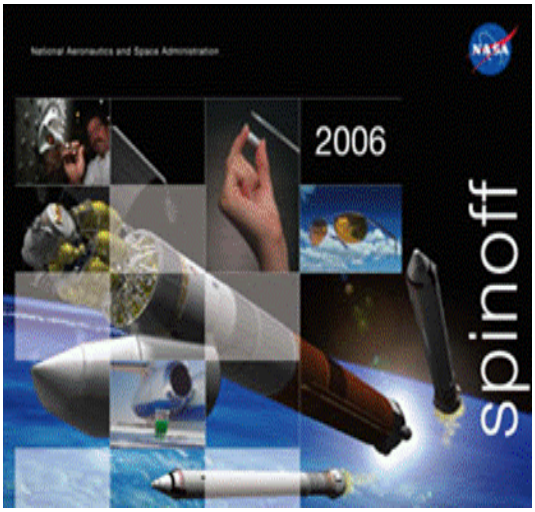
Managing Editor: Donna Ozburn

Editor: Kathleen Millson

Please submit articles for the next quarter no later than February 16, 2007 to kathleen.m.millson@nasa.gov

Independent *and* Innovative Verification and Validation

Spinoff is NASA's annual premiere publication featuring successfully commercialized NASA technology. For more than 40 years, the NASA Commercial Technology Program has facilitated the transfer of NASA technology to the private sector, benefiting global competition and the economy. The resulting commercialization has contributed to the development of commercial products and services in the fields of health and medicine, industry, consumer goods, transportation, public health, computer technology, and environmental resources. Since 1976, *Spinoff* has featured between 40 and 50 of these commercial products annually. The IV&V Facility is proud to be a featured contributor in the 2006 *Spinoff* . The following is an excerpt of the recently published article that exemplifies IV&V's commitment to technology innovation and integration.



Spinoff: Originating Technology/NASA Contribution

NASA's Metrics Data Program Data Repository is a database that stores problem, product, and metrics data. The primary goal of this data repository is to provide project data to the software community. In doing so, the Metrics Data Program collects artifacts from a large NASA dataset, generates metrics on the artifacts, and then generates reports that are made available to the public at no cost. The data that are made available to general users have been sanitized and authorized for publication through the Metrics Data Program Web site by officials representing the projects from which the data originated.

The data repository is operated by NASA's Independent Verification and Validation (IV&V) Facility, which is located in Fairmont, West Virginia—a high-tech hub for emerging innovation in the Mountain State. By extending its data to public users, the facility has helped improve the safety, reliability, and quality of complex software systems throughout private industry and other government agencies. Integrated Software Metrics, Inc., is one of the organizations that has benefited from studying the metrics data. As a result, the company has evolved into a leading developer of innovative software-error prediction tools that help organizations deliver better software—on time and on budget.

Partnership

Since 2002, Integrated Software Metrics has not only studied NASA's metrics data, but has contributed to the maturation of the Agency's Metrics Data Program, through a contract with Galaxy Global Corporation, Inc.; both Integrated Software Metrics and Galaxy Global reside nearby the IV&V Facility in Fairmont. This contract enabled Integrated Software Metrics to work together with Glenn Research Center to generate metrics for the Metrics Data Program's data repository. NASA is now leveraging what was learned from this collaboration to better identify error-prone computer code and, hence, assure mission success.

(continued next page)

Commercially, Integrated Software Metrics has tapped into everything it has learned from its partnership with NASA to create a new, artificially intelligent product suite called Predictive. Prior to introducing the software to market, the company tested it on very large NASA software projects consisting of over a million lines of computer code, in order to ensure its efficacy.

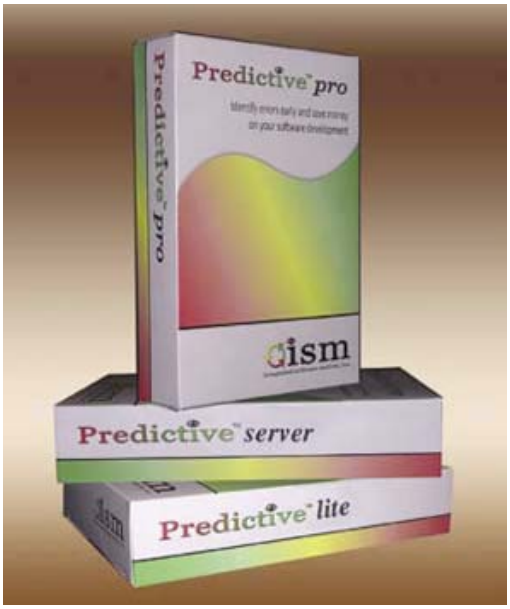
Product Outcome

The final product, Predictive Server, was released in September 2005. Predictive Server contains all of the features of Lite and Pro, and is scalable for network or distributed deployment. Unlike its predecessors, however, it was developed as a Web-based risk management tool for multiple software projects, and it facilitates collaboration among project managers, developers, and software quality assurance professionals. Essentially, the software aims to meet the demands of having to manage multiple software projects in a networked environment.

When Predictive Server is used on a software project, error data and metrics are compiled and stored in the software's knowledge database from the very beginning of the project until the end. Thereafter, this historical database of metrics can be used for other software projects in the enterprise. Because Predictive Server is Web-based, all authorized software project teams can access and update the database, helping the organization deliver better software and save development costs.

In late 2005, Integrated Software Metrics announced a 200-percent surge in sales of its Predictive error-prediction tools. Driving this boost were new customers in the telecom, energy, technology, and government markets, including organizations such as Compagnie Financière Alcatel (Alcatel); Chevron Corporation; LogLogic, Inc.; and Northrop Grumman Corporation.

Spinning back to NASA, the Glenn and Goddard field centers are currently using the entire Predictive suite. Both centers rely on the products for critical code that supports NASA's Earth-orbiting spacecraft.



The Predictive product suite analyzes and predicts defects in software projects, allowing the user to identify the best metrics and thresholds to apply across one or more projects.

Predictive™ is a trademark of Integrated Software Metrics, Inc. Java™ is a trademark of Sun Microsystems, Inc.

Earning 9 out of 10 stars from CRN magazine, Predictive Pro gives quality assurance managers "a tool with teeth."

The software is deployed on the same PC where the targeted code resides. The user just directs Predictive Pro to the code and metrics are generated. The output shows every module in the project, the associated metrics, its location, and error data for that module. Predictive Pro's color-coding scheme of red, yellow, and green readily identifies the code modules of high, medium, and low risk, so that errors can be found easily.

IV&V Research *Spins* Real Time Operating Systems

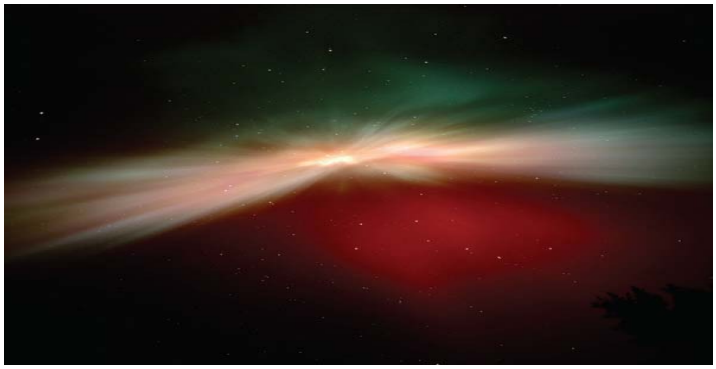
IV&V is committed to meeting the challenge of transitioning research into practice. A recent success is our work on the robustness testing of a type of COTS software know as Real-Time Operating Systems (RTOS) which are used heavily in mission critical embedded systems.

Research to date has included the robustness testing of the Real-Time Executive for Multiprocessor Systems (RTEMS) operating system. RTEMS is an open source real-time operating system commonly used in embedded systems and found on several NASA missions. Preliminary results have identified a number of RTEMS directives that may be candidates for concern when used on mission critical systems. It is important to note that these functions do not always fail under execution, only in the presence of certain input parameters. Results such as these provide the IV&V Facility with a means for assuring that NASA flight software using COTS components, such as RTEMS, does not execute in a fashion that could result in a failure in the operating system.

This approach provides automated support for this very particular testing, a capability we did not previously possess. And this new capability is being made available to three different projects to date, so that analysts have more information to support their efforts. NASA's Time History of Events and Macroscale Interactions during Substorms (THEMIS) mission is one of the three projects (see photo above right).

Based on the results of the testing, an avionics control subsystem for a NASA mission was analyzed for 17 directives found to fail when passed certain parameters. A detailed analysis and trace of the source code was performed to determine the probability of the flight software passing a parameter to RTEMS that would result in a failure as identified by the tests.

Four RTEMS directives referenced in the source were found, and further analysis revealed that the flight software would not pass any of the parameters that would lead to failure. While no issues were identified with the flight software it was possible to provide additional assurance to the developers. This effort provided proof that it is possible to perform such an analysis given the results of the robustness testing.



THEMIS: Scientists will embark on a revolutionary journey to study the iridescent Northern Lights. During this 2-year mission, five identical probes will identify and track the magnetic field reconfigurations, accelerated flows, enhanced plasma waves, and energized particles that accompany the release of energy that occurs during substorms. The spacecraft will provide the observations needed to identify the mechanism that triggers substorms, which has thus far remained a scientific mystery. Planned launch date, February 15, 2007.

The results of this analysis were communicated to the software developer and were received very well. Furthermore, the preliminary documentation of our testing for RTEMS 4.6.6 was passed to the developer to serve a reference for future builds of the flight software. Current work involves identifying and testing VxWorks routines that are implemented in the Gamma-ray Large Area Space Telescope (GLAST) mission, and Research plans to continue to provide support to this project.

The R&D Program has a team of 3 students leading the IV&V Facility involvement in the research. The team consists of Justin Morris (WVU), Tobias Brozenick (WVU), and Jacob Brozenick (FSU). Research has been performed in-house at the IV&V Facility since June 2006 and is expected to continue through 2007 and include the evaluation of other RTOS, including VxWorks, as well as other COTS applications.

IV&V Research *Spins* Lyapunov Stability Analysis & On-line Monitoring

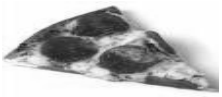
One of IV&V research efforts that wrapped up this year is *Lyapunov Stability Analysis and On-Line Monitoring* (http://sarpresults.ivv.nasa.gov/ViewResearch/65.jsp). The work was focused on flight control and had been tested on the Intelligent Flight Control System at Dryden Flight Research Center (http://www.nasa.gov/centers/dryden/news/FactSheets/FS-076-DFRC.html). Though originally intended for use in a flight environment, aspects of the research are finding their way into unexpected usage.

IFCS testbed aircraft— a highly-modified McDonnell-Douglas NF-15B Eagle formerly flown in the Advanced Control Technology for Integrated Vehicles project at NASA Dryden 1996 through 1999.

Since the research has been focused on improving real-time response of an aircraft, one of the prime considerations was obtaining accurate decisions as quickly as possible. As is obvious, being able to react quickly to off-nominal situations is essential in flight. For example, during an F-16 training flight, a bird strike cause the loss of an engine subsequently downing the plane; it is apparent that these are not situations where it is possible to wait for the software to perform. In an attempt to improve performance while maintaining the fidelity of the information, the research team working on the *Lyapunov Stability Analysis and On-Line Monitoring* initiative has successfully applied a technique to decompose the data and then assess subsets of it.

Though NASA is re-evaluating our priorities in the arena of flight, this approach has moved from the airfield to a corporate test-bed. A large company whose business includes the flow of vast amounts of information across their networks is currently evaluating this approach in the company's R&D labs to assess its efficacy at early detection of network traffic anomalies to support intelligent adaptation.Though it's not the use anyone originally had in mind, we are thrilled to see research get a real world test.

Serving up A Slice of History



In addition to working toward the NASA Mission as stated in the 2006 NASA Strategic Plan, "To pioneer the future in space exploration, scientific discovery, and aeronautics research," we, the NASA family, also work to create the future for and inspire the *next* generation of scientists, engineers, and explorers. But, what about the past generations? That first generation that worked for NASA, the first generation that was inspired by NASA, and those generations who have since inspired us. Do we need to inspire them?

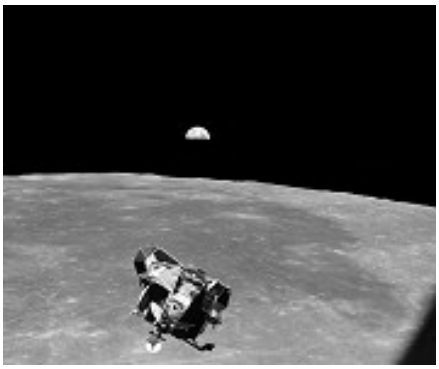
Moonbound Apollo 11 clears the launch tower

One evening my husband and I walked into a local pizza joint. While waiting to get our food, a fifty-something year old man working behind the counter noticed my badge….it's become such a habitual part of my attire that I often forget it's on. This gentleman (who I will refer to as Bob) seemed genuinely interested. He asked the typical questions: what do you do, is it fun, etc. As he handed us our pizza he said, "I want to talk to you about this more."

(continued on next page)

Of course, we thought he was just being polite and trying to keep us as customers, but we were wrong. The next week, we walked in to pick up another pizza and Bob recognized us immediately. He dropped what he was doing and made a b-line to us., “I’ve been thinking a lot about this since I met you two. You don’t know because it was before your time, but the Apollo missions were part of the most amazing time in this country. When we were kids we took entire days at school to watch the flight. It wasn’t just something to do, it was amazing! That was a time when our country could do any thing, go any where! You need to know that. After the Vietnam War, we lost interest. Back then though, it was amazing!”

Bob went on to tell us that he was in England when Apollo 11 landed on the moon. He described the excitement of that day, and how the English shared in the excitement, for both the United States and the world. Everyone was looking forward to what we were going to do next. While we stood there mesmerized by this man’s passion, he told us a story about two men building a cathedral in Europe. When asked by a passer-by, “what are you doing here?” The first man responded, “I’m making money for my family.” But when the second man was asked the same question, he responded, “I’m building a glorious house to praise our heavenly Father.”

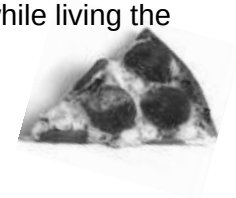


Flight controllers during lunar module descent

Bob completed his monologue with an apology, “I’m sorry to have taken your time, but I’m sure there are other fifty-somethings that would agree. You are doing great things for this country. I just needed to tell you that.”

This man was so inspired by watching the Apollo missions in his youth that he felt that he needed us to know what an amazing time that was and how we should be inspired by those accomplishments and even those that are yet to come. And, the story of the cathedral builder is not unfamiliar to NASA. In the 1960s, Lyndon Johnson asked a janitor at the Kennedy Space Center, “What do you do here?” Without hesitation, the janitor answered, “I am helping to put a man on the moon.”

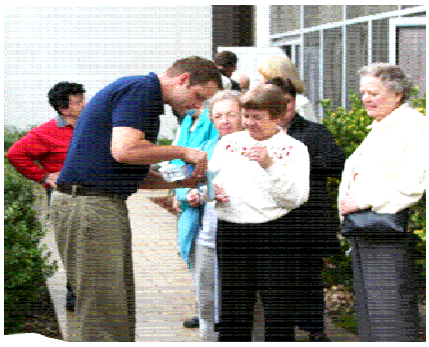
It’s easy for us to get lost inside our cubicle walls and forget that we are part of a larger effort. Let’s not let our titles limit the impact that our minds, our attitudes and our passion can have on achieving the NASA mission. In our own *you-nique* way, we each make a very special contribution. So, take a moment to ask yourself, “What do I do here?” If you don’t know, you need to go pick up a pizza and ask for Bob. He’ll tell you that every day *you* are helping to put the next generation on the moon while living the dreams of the past generations.



To the Moon and Back

Life Long Learners visited NASA IV&V's Shuttle Flight and Docking Simulators and participated in a discussion with IV&V Research Director, Marcus Fisher, on the topic "Why the Moon?"

The annual program, sponsored by Fairmont State, provides an opportunity for local senior citizens to return to go to college—many for the first time. Students in the program represent an important NASA constituency and often inspire more than one generation to follow them into the university classroom.



Jess White assists LLL participants as they prepare for a pop-rocket launch.

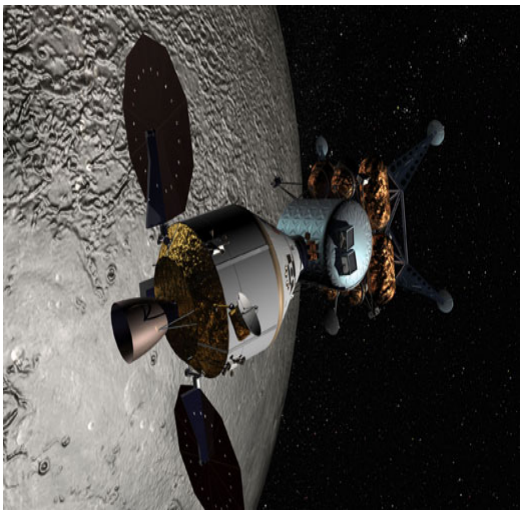
Orion, *The Hunter*

Orion, NASA's newest generation of exploration vehicles, is named for one of the brightest, most familiar and easily identifiable constellations. Orion is scheduled to fly its first missions to the space station by 2014 and carry out its first sortie to the moon by 2020.

Orion will be capable of carrying up to 6 crew members and cargo to the space station. It will be able to rendezvous with a lunar landing module and an Earth departure stage in low-Earth orbit to carry crews to the moon and, one day, to Mars-bound vehicles assembled in low-Earth orbit. Orion will be the Earth entry vehicle for lunar and Mars returns.

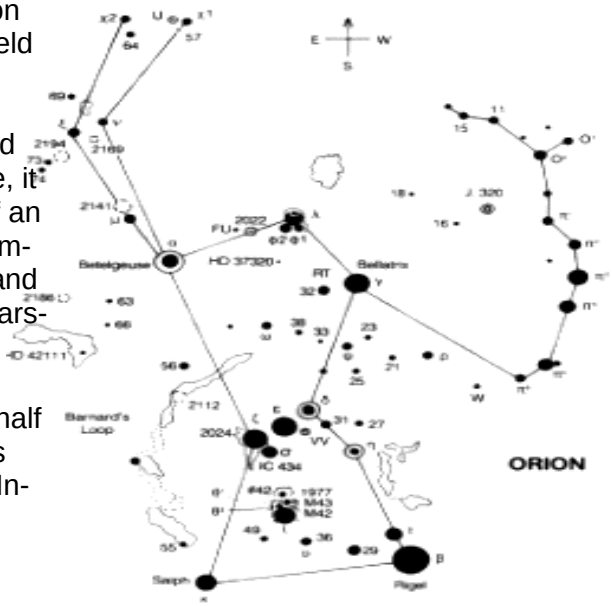
Orion's design will borrow its shape from the capsules of the past, similar in shape to the Apollo spacecraft, but significantly larger, and takes advantage of 21st century technology in computers, electronics, life support, propulsion and heat protection systems. The Apollo-style heat shield is the best understood shape for re-entering Earth's atmosphere, especially when returning directly from the moon. Orion will be 5 meters (16.5 feet) in diameter and have a mass of about 22.7 metric tons (25 tons). Inside, it will have more than two-and-a-half times the volume of an Apollo capsule. The larger size will allow Orion to accommodate four crew members on missions to the moon, and six on missions to the International Space Station or Mars-bound spacecraft.

Establishing its verification and validation efforts on behalf of the Constellation Program, initially IV&V will focus its efforts on Block 1A — crew and cargo to and from the International Space Station.

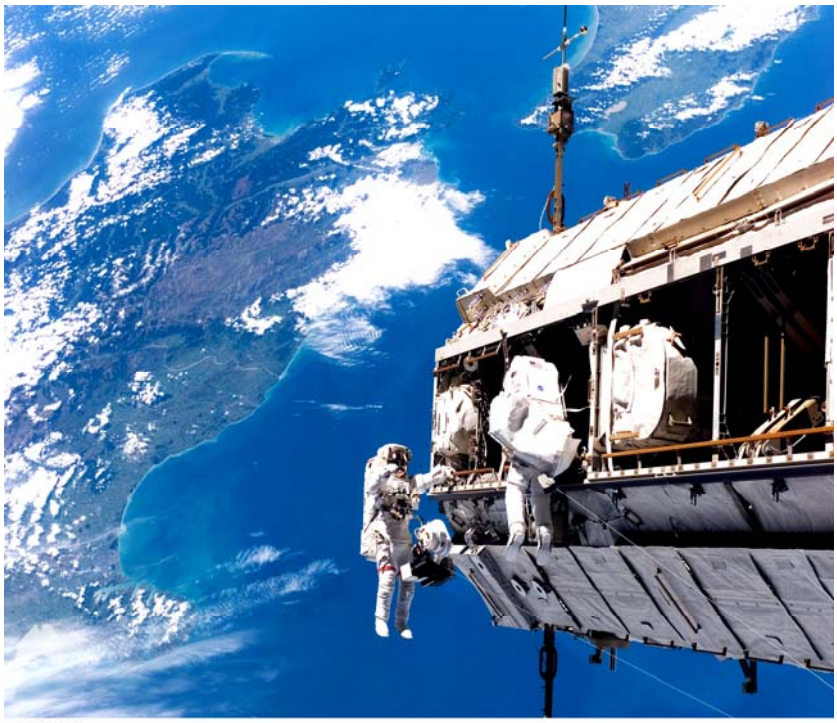


This artist's concept of a lunar lander docked with an Orion crew vehicle while in orbit around the moon.

Image Credit: Lockheed Martin Corp.



There’s Nothing Quite Like a Brisk Walk



Backdropped by New Zealand and Cook Strait in the Pacific Ocean, Mission Specialists Robert Curbeam (left) and Christer Fuglesang take part in the mission's first spacewalk. Curbeam set a shuttle program record for the most spacewalks performed by one astronaut during a single mission Image credit: NASA

The 75th spacewalk in the International Space Station's history and the second for the STS-116 mission was made by Mission Specialists Robert Curbeam and Christopher Fuglesang. The team successfully reconfigured power on channels 2 and 3 of the outpost's electrical system, finishing the work in less than the allotted six hours.

During the spacewalk, "there were a lot of cheers on the ground," said Lead STS-116 Spacewalk Officer Tricia Mack. "It just kept clipping along and the next thing you know, at five hours they were in."

Williams accompanied Curbeam on the mission's third spacewalk two days later as the pair finished the power work outside the station, rearranging power on electrical channels 1 and 4. With this activity completed, the station is ready for the future additions of European and Japanese laboratory modules.

First U.S. Spacewalk ? Credit the Gemini 4 Mission. In 1965, 42 years ago, astronaut Edward White made the first U.S. Spacewalk. Tethered to his Gemini IV capsule, White is pictured above holding a compressed gas "zip gun" for maneuvers in his right hand.

His spacewalk began over the Pacific Ocean near Hawaii and ended 23 minutes later above the Gulf of Mexico.

Of course, the term spacewalk is a bit deceiving as White was falling freely in low earth orbit alongside his capsule manned by fellow astronaut James McDivitt.

In free-fall, White was able to control his motions by firing bursts from his gun until its supply of compressed gas ran out.

He ultimately returned, exhausted, to the two-man Gemini capsule.

Space Station Science...the Gift that Keeps on Giving

The International Space Station (ISS) has received press in recent times because of visits of millionaire civilians, rumors of needing to be abandoned because of the inability to ferry crew and cargo and, most recently, news focused around a commercial venture to hit a lightweight golf ball off of the structure. These might catch our attention but often are a distraction from the core purposes and accomplishments of ISS.

Major goals of ISS are to learn to live and work outside the environs of the Earth, to create opportunities for international cooperation and to perform scientific research that cannot be reasonably performed on the surface of the Earth to further life here and exploration beyond. What is not being heralded in the press is the excellent scientific research that is being performed on ISS today, even with ISS under construction and with a crew that is a fraction of the size of what it will be when ISS is fully operational. To give just a taste of what is being done right now on ISS, this article provides some highlights of the scientific experiments being performed during the current crew's mission, known as Expedition 14.

Experiments aboard ISS during Expedition 14 fall into several categories. Experiments related to spacecraft systems are meant to help develop technologies to support future spacecraft and exploration missions. These include study of the performance of a new type of composite hinge, tests of a portable system to quickly detect the presence of undesirable chemical or biological substances on board ISS, long term study of the effects of direct exposure of certain materials to the space environment, study of vibrations and accelerations induced by vehicle control burns, docking, and undocking and experiments in multiple vehicle formation flying in space.

Human life science investigations study the effects of microgravity on humans. Studies in this category include the long term effects of cosmic radia-

tion on the central nervous system, behavioral issues associated with isolation and confinement, study of changes to the immune function of the body, the use of countermeasures to combat hypotension upon return to an Earth environment, the types and variety of foods needed to maintain crew health over long periods, study of use of countermeasures to prevent renal stones on extended missions, the effects of spaceflight on sleep-wake cycles, the long term effects of radiation on complex organic materials such as vitamins and foods, and brain adaptation to the eye-hand coordination differences in Earth and microgravity environments.

Other biological experiments study the reaction of plants and microbes to the space environment. These include determining the amount of artificial gravity needed to seed lentils to grow in a certain direction (to sustain healthy long-term growth), evaluation of the effects of stress in the space

environment to certain types of microbes, risk assessment regarding the types of microbes that are found on board ISS, and molecular analysis of the growth patterns of plants in microgravity to determine best practices for successful plant growth.

Astronauts take images of the Earth both to see trends over time and to capture one-time events. A library of more than 180,000 such images has been collected by ISS crew prior to Expedition 14. Further, a number of science payloads are being flown to engage the educational community. These allow students to observe science and technological principles at work, permit students

to selectively image the Earth, and encourage students to do short and long term study of the effects of space on different Earth materials such as seeds (and plant growth), wool, silk, chicken bones and human hair.

If time and space permitted, further experiments could be listed here including the eight experiments done in conjunction with the Space Shuttle flights, the twenty-four European experiments, and the fifty Russian experiments that are being performed in conjunction with Expedition 14. These experiments cover commercial enterprise, biomedical, geophysical, biotechnical, physiological, space science, and educational disciplines.

Next time the International Space Station comes to mind, take a look at what is going on there right now. Take a look at the history of what has already been done aboard ISS in previous expeditions. Imagine what can be started over the next few years as new laboratory space and capabilities are added. You can find the ISS consolidated launch manifest that shows the coming growth of ISS at http://www.nasa.gov/mission_pages/station/structure/iss_manifest.html. Much more on Expedition 14 and other expedition science is made available to the public at http://www.nasa.gov/mission_pages/station/science/index.html.

ERC Promotes Podcasting in West Virginia Classrooms

Podcasting allows teachers and students to listen to lectures or lessons, the latest news events, educational commentary, audio books, foreign language lessons, and much more, on demand. The educational implications of podcasting are immense since podcasts are free and can deliver educational content for viewing on a computer or portable device such as an iPod, freeing learning from constraints of the physical classroom, scheduled programming, and access to multimedia equipment. Once teachers subscribe to a podcast appropriate for classroom use or their own professional development, the audio files will be regularly downloaded and are instantly ready for integration in the learning process at the push of a button.

Through a K-12 Teacher grant provided by the West Virginia NASA Space Grant Consortium, 50 WV teachers from Clay, Marion, and Upshur counties traveled to the NASA IV&V Facility's Educator Resource Center (*ERC*) and received training in locating, downloading, managing, and integrating podcasts in their classroom. They also received an iPod Nano and a set of portable speakers, so they will be able to utilize the technology where it best fits their curriculum. Teachers in all three counties also received a follow-up training on how to develop their own classroom podcast using available free software. Additionally, the grant provided equipment to develop and publish the WV Science Podcast for educators, which is located at www.wvglobe.org/podcast/. This podcast is an "ask the scientist" series, where questions provided by students are answered by a consortium of experts from WV institutions including West Virginia University, Fairmont State University, A-B College, Glenville State College, and West Virginia State University. Additionally, an online discussion forum, located at www.wvglobe.org/phorum/, has been used by participating teachers to share questions and answers on the integration of podcasting.

Teachers have been excited to participate in this innovative program and have found dozens of appropriate podcasts for their classroom. Many participants have expressed gratitude for the trainings and have reported that their students love using multimedia to enhance learning. One teacher wrote, "With the plethora of new technology flooding the educational environment, training like this is invaluable for those of us who are 'digital immigrants.' Please continue to keep us up-to-date with the advances in technology and professional development opportunities." Based on requests from participating teachers and interest at conference presentations, future opportunities provided by the NASA IV&V ERC will include expanded use of video podcasts and more extensive training on how to create audio and video podcasts in the classroom. *If you have questions about NASA and Podcasting, feel free to contact the author at todd.ensign@ivv.nasa.gov.*

Classroom Confessions

Career Fairs are often an exercise in discouragement for many young students. They are rounded up by well-meaning teachers to listen to a finely-tuned speech, often about the students' career possibilities in general and the amazing career of the speaker in particular, often leaving more intimidated than inspired. That was not the experience of nearly 70 students who gathered in a science classroom at Liberty High School this fall. Expecting to hear about careers as astronauts and scientists, most of them (those not especially steeped in STEM) shifted in their seats to get comfortable for a long discussion that wouldn't include them.

But that day the speaker began by confessing details, some of them a bit embarrassing, about his own often-interrupted and very uncertain path to and through college. Then he began a game of career volleyball by shouting out, "what's *your* favorite subject?", and volleyed back to students all over the classroom with a NASA career to match their interests. Volleying from computer engineer to graphic artist to veterinarian, he unfailingly matched student to possibility. He also led he potential scientists and astronauts in a challenging discussion about experiments that are conducted on the International Space Station. Newly inspired and not at all intimidated, the students left him with a sincere "thank

Two Kinds of Gratitude—The sudden kind we feel for what we take; the larger kind we feel for what we give.

(Edwin Arlington Robinson)

It has truly been a season of giving. Participation in the Combined Federal Campaign was more robust than ever before. Over 60% of our colleagues contributed either through payroll deduction or with one-time gifts resulting in IV&V being one of the highest per capita donors in the region. Clearly we share in a great love of community for, in addition to the Campaign contributions, the IV&V family raised nearly $200 for the Marion County Union Mission, and $238 plus a trunk load of food for the Marion County Salvation Army Food Pantry! The annual IV&V Holiday Celebration auction, raised $2,195 that was divided evenly and gifted to the Marion, Monongalia, Taylor, and Harrison County Salvation Army Food Pantries!

Thanks to the overwhelming generosity of several of our colleagues, we once again supported the Scott's Run Settlement House Adopt-A-Family Program. We started off with just two families, but with the last minute need expressed by Scott's Run, we pulled together and supplied 3 additional families that without our efforts may not have been adopted this year.

Here are a few Adopt-a Family statistics of the past three years: 2004: 2 families, 9 people; 2005: 4 families, 11 people; 2006: 5 families, 19 people + an additional family picked up personally by a few of you. In 2006, we collected $755 + $200 in donated gift cards + a few hundred dollars in donated items including two beautiful hand knit scarves. Contributions amounted to $70 dollars a family member, which enabled us to supply the families with coats, an outfit or two, stockings with soaps/toothbrushes/etc, and a very special toy or two.

This has been a very rewarding year to be a member of NASA's incredibly caring and generous IV&V family. We are all enjoying a feeling of "the larger kind of gratitude."

Our Value-Ables: *2006 Peer Awards*

We honor those among us whose contributions reflect our values.

Ken Vorndran, Delma Moore, Kaci Reynolds, Meagan Carrier, Natalie Alvaro, Jeff Northey, Melissa Northey, Jerry Gilley

I have been working as Deputy Project Manager (DPM) on the James Webb Space Telescope (JWST) Project with Ken Vorndran providing assistance, guidance, and mentorship. In this role, Ken has gone above and beyond the call of duty to provide training and opportunity for me to learn the technical details of the project and the various responsibilities of the Project Manager. Despite an incredibly full schedule, he will place other issues and responsibilities on hold in order to show me how to perform duties or handle issues rather than more expediently handling them himself. In other instances, Ken will grant me the autonomy to handle situations that arise and support my choices even if he knows a better way to handle it. This provides invaluable real time learning and experience that requires sacrifice and patience that are beyond what the duties of a mentor or Project Manager would require. While Ken often takes time out of his busy schedule to provide guidance and instruction to me, some of his most valuable training is provided by the example he sets. He consistently demonstrates a dedicated work ethic, attention to detail, patience with others, and a level of self-discipline that the rest of us should constantly strive to achieve. It is not only an unbelievable opportunity to work alongside Ken, it is a privilege and an inspiration.

Nominator: Jerry Sims

The outstanding IV&V RMO team—Delma Moore, Kaci Reynolds, Meagan Carrier, and Natalie Alvaro—accomplished the critical task of accurately closing out financials for the 06 fiscal year on time through exemplary collaboration. With new changes occurring within accounting systems, each of the team members overcame every obstacle, met every challenge presented by their responsibilities, and consistently and effectively communicated to all of IV&V's stake holders. Individually and as a team they were fully committed to the success of the End of Year close-out process ensuring that the data would be accurate and audit reports would be flawless for IV&V/GSFC and the NASA Agency. This impressive high-performing team has established a standard for attention to detail and dedication to excellence.

Nominator: Mike Powers

Jeff Northey, Melissa Northey, and Jerry Gilley accepted the task to performing traceability analysis on the Constellation Architecture Requirements Document knowing that this work was in addition to their normal duties. Not only did the team members accept performing the work but they voluntarily chose to work beyond their normal time allocation for Constellation in order to provide the highest quality traceability analysis possible in the two week period allotted for this activity. The team agreed to use a process they had not used before for performing traceability and provided useful feedback on the process to the team lead. In many instances, team members collaborated and assisted one another with difficult to understand requirements and corrections to traceability work products. Overall, the traceability team members cited here submitted twenty-one formal issues to the Constellation Program. Each of these formal issues survived stringent peer reviews. Further, numerous technical issues that do not fall under the purview of the Constellation System Requirement Review but that are valid issues were produced and will be submitted to the project.

Nominator: Markland Benson